

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :

A63F 9/22

A1

(11) International Publication Number:

WO 93/23125

(43) International Publication Date:

25 November 1993 (25.11.93)

(21) International Application Number: PCT/GB93/00997

(22) International Filing Date: 14 May 1993 (14.05.93)

(30) Priority data:

9210363.9

14 May 1992 (14.05.92)

GB

(71) Applicant (for all designated States except US): CODEMASTERS LIMITED [GB/GB]; 90 Fetter Lane, London EC4A 1JP (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): DARLING, David [GB/GB]; Woodlands, Hareway Lane, Barford, Warwickshire CV35 8DD (GB). LINK, Ivan [GB/GB]; Highfield, 5 Main Street, Keevil, Wiltshire BA14 6LU (GB).

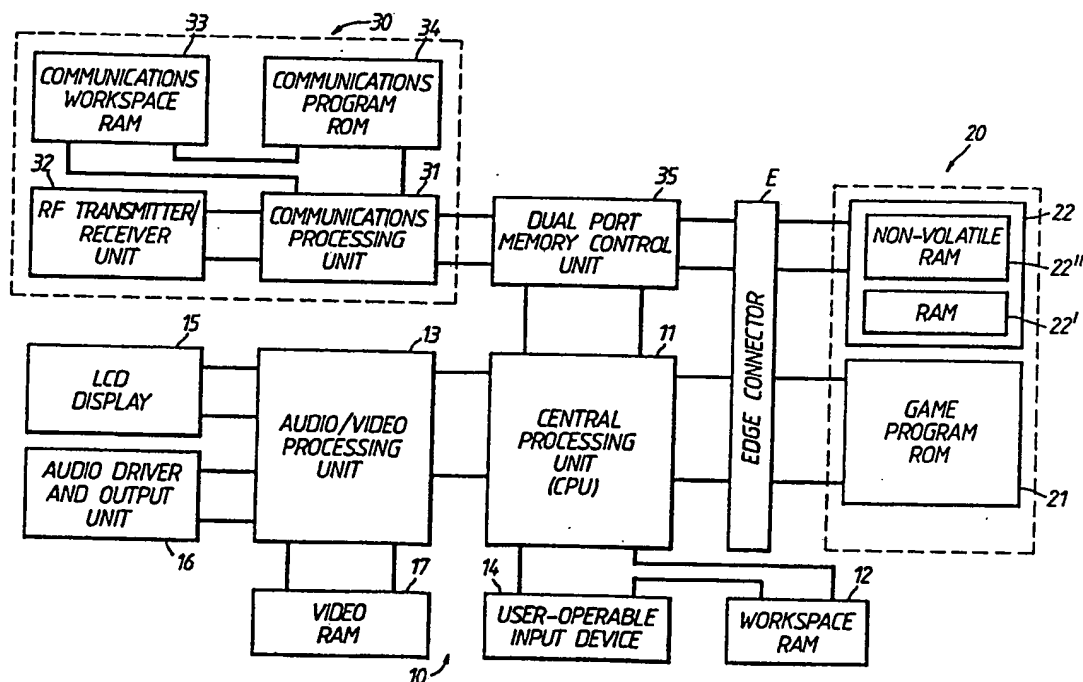
(74) Agent: MATHISEN MACARA & CO.; The Coach House, 6-8 Swakeleys Road, Ickenham, Uxbridge, Middlesex UB10 8BZ (GB).

(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published

With international search report.

(54) Title: CONNECTING COMPUTER GAMES VIA A COMMUNICATION NETWORK



(57) Abstract

A computer game system allowing interactive, wireless multiplayer game play comprises a portable computer game machine (10), memory device (20) detachably connected to the portable computer game machine (10) and a communications unit (30). The communications system and protocols allow for interactive or standalone game play to occur between players and also allow games to be updated to include new features and/or options.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SK	Slovak Republic
CI	Côte d'Ivoire	LI	Liechtenstein	SN	Senegal
CM	Cameroon	LK	Sri Lanka	SU	Soviet Union
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	MC	Monaco	TG	Togo
DE	Germany	MG	Madagascar	UA	Ukraine
DK	Denmark	ML	Mali	US	United States of America
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

- 1 -

Connecting computer games via a communication network

#### Technical Field

This invention relates to a computer game system, particularly a computer game system comprising a portable computer game machine. More specifically, the present invention relates to a hand-held computer game machine which is operable to communicate in a wireless manner with other hand-held computer game machines to allow multiple players to interact while playing a game. The invention also relates to a method of communicating between the above-described hand-held computer game machines.

#### Background Art

Hand-held computer game machines are self-contained, battery-powered units having a built-in display, usually in the form of a liquid crystal display and one or more user-operable key enabling different, user-controllable functions to be performed.

A known computer game machine of this kind, described in U.K. Patent Publication No. 2226768A, also has electrical input/output sockets by which two or more machines can be physically wired together enabling two or more players to participate in the same game.

However, such wired interconnections are cumbersome and inconvenient in that they greatly restrict the movement of the players. Further, the number of machines which may be connected by such wired interconnections is typically quite limited.

It is an object of the present invention to provide a novel portable computer game machine which allows for interactive game playing by two or more players.

**SUBSTITUTE SHEET**

- 2 -

Disclosure of the Invention

According to one aspect of the invention there is provided a computer game system comprising a portable computer game machine and a memory device detachably connected to the portable computer game machine characterized in that the computer game system incorporates communications means enabling the computer game system to operate interactively with at least one other such computer game system.

According to another aspect of the invention there is provided a portable computer game machine for use with a detachable memory device, the portable computer game machine being characterized by communication means for enabling the computer game machine to operate interactively with one or more other such computer game machine.

According to a yet further aspect of the invention there is provided a memory device for use with a portable computer game machine, the memory device comprising at least one game program and communication means.

According to a yet further aspect of the present invention there is provided a portable computer game machine comprising: a display means; a use input means; memory means; processor means; and wireless communications means to allow exchange information with at least one other computer game machine to allow interactive game play between said computer game machine and said at least one other computer game machine.

According to a yet further aspect of the present invention there is provided a method of establishing an interactive game session between at least two game machines, comprising the steps of: (1) activating a first game machine; (2) detecting the presence of at least one other game machine within communications range; (3) determining

**SUBSTITUTE SHEET**

- 3 -

if the first game machine may join the at least one other game machine in an interactive game; (4) notifying said at least one other game machine of the presence of said first game machine; (5) commencing the exchange of interactive game session information with said at least one other game machine.

Computer game systems, machines and memory devices according to the invention have the advantage that they enable two or more players to participate in the same game without the need for wired interconnections, which are inconvenient and cumbersome.

They also offer the significant advantage that they allow unapproved, unseen and unknown players to interact and participate in games with other players. That is, a player could enter a game with one or more other player without their permission or even without their knowledge providing he is within transmission range, and could also drop out of the game at will. The new player could be out of sight and earshot of the other players. This would expand the scope of the playability of game play and thus increase the players' enjoyment. Clearly, anonymous, interactive play of this kind would be impossible using game machines having wired interconnections.

They also offer the advantage that the games may be updated, after their initial release, to include new features and options. This may be accomplished by providing an updated games to one or more machines in a conventional manner after which, these updated machines in turn update other non-updated machines each time they are encountered. Each updated machine will update each non-updated machine it encounters and a substantial number of machines may be updated unobtrusively in this manner.

**SUBSTITUTE SHEET**

- 4 -

The invention finds particular, though not exclusive application for games involving a "Dungeon and Dragons" type environment, in which different characters (i.e. players) have the capability to complete, to gain, capture or lose game parameters such as strength, skills, possessions etc., and even to co-operate with other characters (players) to defeat a common adversary.

In such circumstances, information transferred from one game machine to another could represent game parameters affecting subsequent play; for example, weapons obtained, or skills captured, or otherwise earned, during game play.

Such game parameters may be stored by the receiving game machine, for use during subsequent game sessions, in a suitable non-volatile memory (such as Flash EEPROM, battery backed-up Static RAM or floppy disk) contained within the machine itself or within a memory device connected to the machine. In this manner, such game parameters are maintained by a player between game sessions, even later sessions with different (known or unknown) players.

It is also contemplated that new parameters may be added to a game at different times. For example, an "Amulet of Power" object may be added to the game several months after its initial release to maintain interest in the game. As described in more detail below, new parameters may be added to one or more game machines and then be transferred to other machines during game play.

#### Brief Description of Drawings

A computer game system in accordance with the present invention is now described, by way of example only, with reference to the accompanying drawings, in which:

**SUBSTITUTE SHEET**

- 5 -

- Figure 1 is a block circuit diagram illustrating a computer game system;
- Figure 2 is a flowchart representing the sequence executed by the computer game system of Figure 1 to establish inter-system communications on start up;
- Figure 3 is a flowchart representing the sequence executed by the computer game system of Figure 1 to update the game database of one or more other computer game systems;
- Figure 4 is a flowchart representing the sequence executed by the computer game system of Figure 1 to maintain inter-systems communications during game play; and
- Figure 5 represents a typical data packet transmitted, in use, by the computer game system illustrated in Figure 1.

#### Description of Preferred Embodiments

Referring now to Figure 1, a computer game system in accordance with the present invention comprises a <sup>mobile</sup> portable, hand-held computer game machine 10 and an external game cartridge 20 which can be loaded into a cartridge-receiving port of the game machine.

The game machine 10 comprises electrical components normally associated with portable, hand-held computer game machines, such as are described in the aforementioned UK Patent Specification, Publication No. 2226768A.

Such components comprise, inter alia, a central processing unit (CPU) 11, which may be a 6502, and CPU 11 is connected by suitable address/data buses to a work-space RAM 12, an audio/video processing unit 13 and one or more user-operable input device 14 e.g. joystick, keypad etc. The audio/video processing unit 13 is, in turn, connected to a built-in display 15, typically in the form of a

**SUBSTITUTE SHEET**



- 6 -

liquid crystal dot matrix display, and to an audio driver and output unit 16. The selection and/or design of audio/video processing unit 13 and display 15 is not particularly limited and will be readily understood by those of skill in the art. Display 15 may be a conventional dot matrix monochrome LCD display or a TFT (Thin Film Transistor) color LCD display. Audio output unit 16 may be monaural or stereo as desired and may be provided through one or more speakers or, optionally, through headphones.

Processing unit 13 controls units 15 and 16 in response to control data supplied thereto by CPU 11 and in response to video data supplied thereto from a video RAM 17.

The aforementioned components 11 to 17 are housed within a casing (not shown) formed with an insertion port into which the external game cartridge 20 is loaded. Game cartridge 20 contains a game program ROM 21 in which is stored the game program defining the rules and the characteristics of the game being played. While in the preferred embodiment the game program ROM is provided in a removable game cartridge 20, it is also contemplated by the present inventors that a 'dedicated' game machine may be desired in some circumstances and that such a machine would comprise a single integral unit.

In operation of game machine 10, CPU 11 addresses, and receives program data from the game program ROM 21 via respective address and data buses which are interconnected, in known manner, by means of a suitable edge connector E.

CPU 11 supplies control data to the audio/video processing unit 13 in response to the received program data and the user-generated data received from the user-operable input device 14.

**SUBSTITUTE SHEET**

A computer game system of the above-described kind is of conventional form. However, in contrast to such conventional systems, a game system according to the present invention further incorporates a communications unit 30 which enables the game machine 10 to operate interactively with at least one other game machine within communications range, enabling two or more players to participate in the same game.

*Low Power RF*

In a preferred embodiment, communications unit 30 is radio frequency based (rf) and provides a substantial range of freedom of movement of one game machine 10 with respect to another. However, it is foreseen that in some circumstances other communications basis such as infrared may be advantageously employed.

*Base station*

It is also contemplated that repeater or base stations may be provided to augment game play. A repeater station may receive radio signals from the game system and rebroadcast the signals over telecommunications links to locations outside the game system's normal broadcast range. This would allow interactive game play between players who are physically located quite distant from one another while still maintaining the advantages of wireless connections between the hand-held game systems.

In contrast, a base station would transmit updates and/or enhancements to multiple game machines from a central control site. It is contemplated that a base station will be constructed to have a significantly greater transmission range than that of the games machines themselves. Thus, the base station may transmit updates and/or enhancements to all the game machines within a wide geographic area which are activated at the time of the transmission. Using such a base station would allow, for example, an enhancement to be transmitted to all active

- 8 -

game machines in the Greater London area which would cause a giant green dragon to immediately confront all of the game players. Of course, base station transmissions are 'one-way' and once transmitted, interactive or standalone game play would proceed as before, albeit with the enhancement or update now included in the game.

In the illustrated embodiment, communications unit 30 forms part of game machine 10. However, the communications unit could alternatively be housed within the external game cartridge 20 loaded into the game machine 10. This would allow otherwise conventional hand-held game machines, such as the Gameboy manufactured by Nintendo Company Limited or the Game Gear manufactured by Sega Enterprises Limited, to be upgraded to comprise a game machine in accordance with the present invention.

Referring again to Figure 1, the communications unit 30 comprises a communications processing unit 31, such as a 17c42 PIC microcontroller manufactured by Microchip, is connected by address/data buses to a radio frequency (r.f) transmitter/receiver unit 32, a communications workspace RAM 33 and a communications program ROM 34. As will be understood by those of skill in the art, transmitter and receiver unit 32 can be constructed either from available transmitter and receiver modules or from a custom built and/or ASIC based device depending upon Government radio regulations and size and power limitations. Processing unit 31 is connected to CPU 11 via a dual port memory control unit 35, and both processing units 11,31 are also connected via unit 35 and edge connector E to an additional memory 22 within the external game cartridge 20. The additional memory 22 comprises a RAM 22' and a non-volatile RAM 22", the function of which will be explained hereafter.

SUBSTITUTE SHEET

- 9 -

Unlike other computer communications systems of which the present inventors are aware, in order for a multiple game machines to operate interactively as a game playing group, each machine in the group must receive data, in turn, from each other machine in the group and transmit data to all the other machines in the group. The data transmitted comprises game play information such as the current status of a character over which the respective player has control, i.e. the current position of that character and/or other game parameters associated with the character, such as number of lives, strength, possessions etc., while the data received comprises similar game play information about characters under the control of other players. This data also comprises various control signals, described below, and information relating to other aspects of game play such as articles or skills available to be acquired by a player, feats which may be accomplished (i.e. the destruction of a monster), etc.

It is also contemplated that at least some degree of direct communication may be provided between players within a game playing group. Depending upon the input capabilities of the game machine, a message intended for another player may be selected from a menu of predefined messages or typing in on a keyboard. Also, a particular accomplishment of one player may result in a message being transmitted to all of the other game machines in the game playing group. For example, killing the giant green dragon would cause the message "David D. has killed the Dragon", to be displayed on the screen of all of the game machines in the game playing group. Of course, such communications and messages would also form part of the information transmitted between the game machines in the game playing group.

A game system such as this is particularly well suited

**SUBSTITUTE SHEET**

- 10 -

(though not exclusively so) to a "Dungeon and Dragons" type environment, in which each character (i.e. player) may challenge other characters, gain (or lose) strength, skills, possessions etc., and co-operate with other characters in order to defeat a common adversary e.g. another character or a monster.

Accordingly, if one player challenges another player and captures a possession, the game parameter representing that possession would, in effect, be transferred between the players' respective machines.

In effect, the communications units 30 associated with all the game machines 10 in the group define a communications network by which information can be exchanged between all of the machines to allow interactive game playing.

The game play information received by each game machine 10 via the communications network is stored in RAM 22' and is up-dated at regular intervals, preferably of less than 1 second duration, which allows interactive playing of the game to proceed. RAM 22' in any particular machine also stores game play information about the current status of the character over which that machine has control, and this game play information will, in turn, be transmitted via the communications unit 30 to all the other game machines participating in the game.

The game play information stored in RAM 22' forms a database representing the current status of all the characters participating in the game. This game play information may include the character's present location, skills, defensive capabilities, etc. The database will be accessed by the communications processing unit 31 in order to transmit game play information to the other game machines, and will also be accessed by the central

**SUBSTITUTE SHEET**

- 11 -

processing unit 11 so that control data passed by the CPU to processing unit 13 will take account of the current status of all players participating in the game at the time. Typically, units 11 and 31 would access the database on a time-sharing basis.

The non-volatile RAM 22" stores additional information which is used during a Logon procedure carried out prior to commencement of the game.

In this particular embodiment, non-volatile memory 22" has three distinct sections, each storing a different category of information and being updatable.

The first section of RAM 22" contains a date-coded listing of all game parameters associated with the game, and such game parameters may include indicia representing: the type of parameter (i.e. objects, places, monsters etc.); the offensive or defensive capabilities associated with the parameter (i.e. provides character with an infinite supply of 'arrows' or enables character to see in the dark); the location of the parameter in the game (i.e. where the Amulet of Power is located, or where the center of the village is); etc.

It is possible that a player might attempt to play a game with another player who has a more recent version of the same game, for which the listing of game parameters stored in the first section of RAM 22" is different. This eventuality will be detected during the initialization procedure, discussed in more detail below, and the old listing will be up-dated via the communications network enabling both players to participate in the more recent version of the game.

The second section of RAM 22" contains game play

SUBSTITUTE SHEET

- 12 -

information about the status of characters and will be up-dated to take account of game parameters that change during the course of the game; for example, skills, possessions etc. that are acquired or lost by the character during game play.

Similarly, the third section of RAM 22" stores the game play information regarding the map positions (locations) of the characters within the game 'world'.

The game play information stored in the second and third sections of RAM 22" enable players to recommence a game exactly where they last stopped playing. This information is stored in non-volatile memory so that it is available when the player next wants to play the game again, despite the game system having been turned off or a different external game cartridge having been inserted to play a different game in the interim. The information stored in the second section of the RAM 22" can also be used to assess whether or not a proposed game play is possible; for example, a player who controls a knight could not be challenged by another player whose character is not wearing armor and is not carrying a sword.

The information stored in the first section of RAM 22" defines the limitations to the game. However, as described in more detail below, the parameters in this section may be updated over time to provide new capabilities and/or to redefine old ones.

As already described, in a group of game machines involved in an interactive game play situation, each game machine 10 in the group must transmit information to, and receive information from, all the other game machines in the group, and the arrangement must be such as to allow players to join or leave the group at will, without prior

SUBSTITUTE SHEET

- 13 -

arrangement and without affecting the continuity of game play for existing or remaining players. As such, each game system is able to operate in a standalone mode wherein no other players are required for game play.

When playing in a multi-player interactive Game Mode, the communications units 30 of the participating game machines transmit and receive information according to a time-sharing procedure in which each machine will transmit information during a respective one of a succession of time slots and will receive information from other machines during the remaining time slots. As described in more detail below, this is an adapted form of time division multiplexing (TDM) of the communications network.

Figure 2 shows the sequence of steps executed by the computer game machine after it is powered on in an attempt to enter interactive Game Mode. As indicated at step 100, the game machine will "listen" for the transmissions of other games machines within range. If no such transmissions are received, the game machine assumes Master Status and begins the transmission of 'dummy' packets at step 102. These dummy packets provide a signal which may be received by game machines which are switched on, or which come into range, after the first game machine has executed step 100. After step 102, game play begins on the game machine in 'standalone' mode while steps 100 and 102 are repeated to check for the presence of another game machine.

When other game machines are detected at step 100, the game machine next determines if a free time slot exists, at step 104. If no free time slot is detected, game play begins or continues on the game machine in standalone mode while step 104 is repeated to watch for a timeslot becoming available.

**SUBSTITUTE SHEET**



- 14 -

If a free time slot exists, the 'new' game machine can enter interactive Game Mode and will join the game by allocating itself a free timeslot at step 108 and transmitting a Logon packet. This Logon packet contains the date of the new game machine's most recent database update and each other game machine in the game receives the Logon packet and indicates (as part of its next transmitted response packet) whether its date of last database update is older, the same, or newer than the transmitted date. At step 112, each game machine in the game examines the Logon packet and the responses from the other game machines and determines if any game machine requires a database update. If all game machines have the same last update date, the new game machine then enters interactive Game Mode at step 116, otherwise the game machines proceed to the update database operation at step 120.

As database updates are performed whenever required, all of the game machines in a game at any time will have the same last update for their databases. Thus, a new game machine joining a game can encounter one of only three situations, namely: its database may have the same last update date as all of the other game machines in the game, thus eliminating the need for an update; the new game machine may have an older update date than the other game machines requiring the new game machine to receive an update; or the new game machine may have a newer update date than the other game machines requiring it to provide an update to the game machines.

Referring now to Figure 3, as part of the update database operation, at step 200 each game machine in the game determines from the results of the transmission of the Logon packet whether it needs an update for its database. If an update is required, the game machine next

**SUBSTITUTE SHEET**

- 15 -

determines, at step 204, whether it is presently the Master game machine. In every interactive game, one game machine is deemed to be the Master game machine and identifies itself as the Master by including a predefined Master status indicator in its transmitted packets. The Master game machine is responsible for the transmission of database update packets to the other game machines in the game.

If the game machine in Figure 3 is presently the Master game machine, it relinquishes its Master status at step 208 simply by ceasing to transmit the predefined Master status information in its packets. Once Master status is relinquished, or if the game machine did not have Master status, the game machine awaits receipt of a Ready packet transmitted from the new Master at step 212. This Ready packet serves both to inform all of the game machines the identity of the game machine which has now assumed Master status and instructs the game machines to commence receiving the database update transmissions at step 216. During database update transmissions, the Master game machine preempts all of the available timeslots in order to perform the update as quickly as possible. Alternatively, after the Ready packet has been sent, the timeslots may be reconfigured by all game machines to provide a significantly longer timeslot to the Master game machine and small timeslots to the receiving game machines. These smaller timeslots would have a length sufficient only to provide an acknowledgement signal from each game machine to the Master game machine to indicate proper receipt of each update packet.

When the databases have been updated, the game machines return to Game Mode 116, reconfiguring the timeslots if required.

**SUBSTITUTE SHEET**

- 16 -

If at step 200 it is determined that the game machine does not require a database update, the game machine determines at step 220 whether it needs to initiate a database update. This determination is made in view of two conditions: (1) is the game machine's date of last database update more recent than that of the other game machines; and (2) is the game machine the Master. If neither condition is true, the game machine's database is already up to date and the game machine simply waits, at step 224, until the game machines requiring updates have been updated from the Master game machine and then Game Mode 116 is resumed.

If either condition is true, the game machine proceeds to step 228 wherein it determines whether it already has Master status. If the game machine does not have Master status (i.e. the game machine's date of last database update is the most recent in the game), it proceeds to step 232 where it waits for the present Master to relinquish Master status (at step 208 for the other game machine). Once Master status has been relinquished, the game machine assumes Master status at step 236 and status has been relinquished, the game machine assumes Master status at step 236 and transmits a Ready packet at step 238 prior to transmitting the database update at step 240.

If, at step 228, the game machine confirms that it is already the Master, it immediately proceeds to transmit the Ready packet at step 238 and the database update at step 240. In either case, once the update transmissions are complete, Game Mode 116 may be resumed.

The communication steps of interactive Game Mode 116 are shown in Figure 4. Game play proceeds at step 300 with each unit receiving packets from all of the other game machines, during each game machine's timeslot. Each

**SUBSTITUTE SHEET**

- 17 -

packet received is checked at step 304 to determine whether or not it is a Logon packet. If the packet received is a Logon packet, the game machine compares its last database update date to that included in the Logon packet and prepares a Response packet which indicates the game machine's last update date at step 308. That Response packet is transmitted, at steps 312 and 316, when the game machine's timeslot next occurs and the game machine then executes the update database 120 function defined above.

If the packet received at step 300 is not a Logon packet, the game play data received is processed at step 320, updating the game play on the game machine. A check is performed, at step 324, to determine if the next timeslot is the timeslot allotted to the game machine. If it is the game machine's timeslot, a game play data packet is prepared and transmitted to the other game machines at step 328. If the next timeslot is not the game machine's allotted timeslot, the game machine again executes step 300 to receive the next data packet.

Typically, only a single transmission frequency would be used between game machines, and the maximum number of players who could participate in the game at any time, i.e. the maximum number of available time slots, would be limited by the amount of information that must be transmitted and the rate at which such information can be processed.

Data packets can be transmitted using any suitably adapted communications protocol known to those skilled in the art. Of course, depending upon the nature of the communications system employed, errors due to 'noise', marginal transmission ranges, etc. may be introduced. Accordingly, as is understood by those of skill in the

**SUBSTITUTE SHEET**

- 18 -

art, suitable error correction facilities such as Hamming Codes, parity checks, CRC's etc. may be employed in the communications protocol to deal with such errors. In the event that a predefined number of transmission errors is detected by a particular machine within a predefined time, due for example to that player being on a train entering a tunnel, the machine can revert to standalone game play mode until proper communications may be re-established. An example of a suitable communications protocol is illustrated, by way of example, in Figure 5.

In this example, the basic transmission package, or packet consists of:

1. A FLAG section used to synchronize the transmitter and receiver,
2. A HEADER SECTION indentifying the type of information being transmitted e.g. Logon packet, Response packet, the game machine from whom and (if desired) to whom the information is being transmitted,
3. A DATA section containing the transmitted information,
4. A CHECK signal containing error detection and/or correction data, and
5. An END FLAG section indicating the end of the data packet.

In the preferred embodiment, each game machine's timeslot would span only enough time to allow transmission of a single packet. The above-mentioned operation of preempting or reconfiguring timeslots during database

**SUBSTITUTE SHEET**

- 19 -

update transmissions would of course constitute a temporary exception to this.

An example of the interactive Game Mode involving three players (identified as A, B and C) in a "Dungeon and Dragons" type environment is now discussed, wherein the players join the game at different times.

In this example, it is assumed that:

- (i) Player A was in the game's forest north of the main town the last time she played (as determined by the map position stored in the third section of RAM 22"),
- (ii) Player B has an old version of the game which needs to be updated, and was in the game's main town the last time he played, and
- (iii) Player C has not played before but has an up-to-date game and will appear for the first time in the centre of the main town.

Players A, B and C switch their respective games machines on at different times - Player A first, then Player B, then Player C.

Players A's machine listens for transmissions from any other machine, fails to detect any and starts transmitting dummy messages representing her identity (i.e. Player A) and her map position (as defined by data in Section 3 of RAM 22").

Player B now switches on his game machine, receives the dummy transmissions from Player A's machine and transmits a Logon packet. Player A's game machine will detect the

**SUBSTITUTE SHEET**

- 20 -

Logon packet, transmit a response packet, detect that an update is required and will commence the Update Database function. Player B's data base will then be updated to the same, more recent, version as Player A's. After the update is completed, the game machines of Player A and B exchange game play data.

During the update function, Player C turns his machine on. In this example, Player A's game machine, acting as Master, has preempted all of the timeslots to maximize the transfer rate of the update. Thus, Player C's game machine cannot detect a free timeslot and his game machine starts in standalone mode. Once the update of Player B's machine is completed, timeslots are again available and Player C's machine detects an available timeslot. Player C's machine transmits a Logon packet and it is determined that his database does not require updating. Player C's machine then enters interactive Game Mode 116 along with Players A and B and Player C commences to exchange game play information with Players A and B.

This simple example demonstrates how the exchange of information between different game machines can be controlled according to a time-sharing procedure.

As will be readily apparent to those skilled in the art the game software stored in game ROM 21 would be designed to ensure continuity of game play should a player drop out of the game, and to take account of potentially conflicting information stored in memories 22 associated with different game machines.

It will be understood by those of skill in the art that, provided a standard communications protocol is employed, the present invention may be implemented to allow interactive game playing between hand-held game machines

SUBSTITUTE SHEET

- 21 -

manufactured by different companies. For example, one or more players could be playing on the above-mentioned Gameboy, which has been suitably upgraded, while other players in the same game could be playing on the above-mentioned Game Gear. In this particular example, all that is needed to allow inter-system communications is a common communications protocol and a game cartridge 20 which is suitable (both electrically and in terms of program instructions) for the target device.

It will be understood that the above-described examples are illustrative only of the present invention, the scope of which is defined in the accompanying claims.

SUBSTITUTE SHEET



- 22 -

CLAIMS

1. A computer game system comprising a portable computer game machine and a memory device detachably connected to the portable computer game machine characterized in that the computer game system incorporates wireless communications means for enabling said computer game system to operate interactively with at least one other such computer game system.

2. A computer game system as claimed in claim 1, wherein said communication means is a radio frequency means housed within the portable computer game machine.

3. A computer game system as claimed in claim 1, wherein said communication means is a radio frequency means housed within the memory device.

4. A computer game system as claimed in claim 3, wherein the memory device is a memory cartridge containing at least one game program.

5. A computer game system as claimed in any one of claims 1 to 3, wherein the memory device comprises a game memory storing a game program and a further memory in communication with the communication means.

6. A computer game system as claimed in claim 5, wherein the communication means comprises r.f. transmitter/receiver means and a communications processor for controlling the r.f. transmitter/receiver means; said further memory being in communication with the communications processor.

7. A computer game system as claimed in claim 6, wherein the further memory is also in communication with

**SUBSTITUTE SHEET**

- 23 -

the main processor of the computer game machine.

8. A computer game system as claimed in any one of claims 5 to 7, wherein said further memory comprises a random access memory for storing data received from said at least one other computer game system via the communications means.

9. A computer game system as claimed in claim 8, wherein said data stored in the random access memory of the further memory is repeatedly updated during game play.

10. A computer game system as claimed in claim 8 or claim 9, wherein said random access memory of the further memory includes a non-volatile random access memory.

11. A computer game system as claimed in any one of claims 1 to 3, wherein the memory device comprises a game memory containing a game program and a further memory including a non-volatile memory, information stored in the non-volatile memory represents one or more game parameters and is retained in the non-volatile memory after the computer game machine to which the memory device is connected has been turned off.

12. A computer game system as claimed in claim 11, wherein the non-volatile memory stores information received by the portable game machine via the r.f. communication means.

13. A portable computer game machine for use with a detachable memory device characterized by communication means for enabling the computer game machine to operate interactively with one or more other such computer game machine.

**SUBSTITUTE SHEET**

- 24 -

14. A portable computer game machine as claimed in claim 13, wherein the communication means comprises r.f. transmitter/receiver means and a communications processor for controlling the r.f. transmitter/receiver means.

15. A memory device for use in a computer game system as claimed in any one of claims 3 to 12.

16. A memory device for use with a portable computer game machine, the memory device comprising at least one game program and communication means.

17. A memory device as claimed in claim 16, wherein the communication means comprises r.f. transmitter/receiver means and a communications processor for controlling the r.f. transmitter/receiver means.

18. A memory device as claimed in claim 17, comprising a memory which is in communication with the communications processor means and stores data received via the r.f. transmitter/receiver means.

19. A memory device as claimed in claim 18, wherein said memory is random access memory.

20. A memory device as claimed in claim 18 or claim 19, wherein the communications processor is also in communication with the main processor of a computer game machine to which the memory device is attached.

21. A portable computer game machine comprising:  
a display means;  
a user input means;  
memory means;  
processor means; and  
wireless communications means to allow exchange

**SUBSTITUTE SHEET**

- 25 -

information with at least one other computer game machine to allow interactive game play between said computer game machine and said at least one other computer game machine.

22. A portable computer game machine as claimed in claim 21, wherein said memory means stores a game program.

23. A portable computer game machine as claimed in claim 22, wherein said memory means further comprises a non-volatile portion of memory to maintain information when said game machine is turned off.

24. A portable computer game machine as claimed in claim 23, wherein said memory means is in the form of a detachable memory cartridge.

25. A portable computer game machine as claimed in claim 24, wherein said communications means is also located in said detachable memory cartridge.

26. A method of establishing an interactive game session between at least two game machines, comprising the steps of:

- (1) activating a first game machine;
- (2) detecting the presence of at least one other game machine within communications range;
- (3) determining if the first game machine may join the at least one other game machine in an interactive game session;
- (4) notifying said at least one other game machine of the presence of said first game machine;
- (5) commencing the exchange of interactive game session information with said at least one other game machine.

27. The method claimed in claim 26, wherein step (2)

**SUBSTITUTE SHEET**

- 26 -

further comprises the step of transmitting information announcing the presence of the first game machine until at least one other game machine is detected.

28. The method claimed in claim 27, further comprising the step of the first game machine providing non-interactive game play prior to the completion of step (4).

29. The method claimed in claim 28, further comprising the step (4a) of determining if either the first game machine or the at least one other game machine has a previous version of the game program to be executed and initiating the updating of that previous version prior to commencement of step (5).

30. The method claimed in claim 29, further comprising the step of preempting the exchange of interactive game session data between all of the game machines in an interactive game session while said updating is proceeding.

31. The method claimed in claim 26, wherein step (5) comprises the steps of:

- (1) each game machine receiving, in turn, interactive game session information from each other game machine participating in said interactive game session; and
- (2) each game machine transmitting, in turn, interactive game session information to all other game machines participating in said interactive game session, wherein said transmitted information indicates changes reflecting both the information received in step (1) and the game play on the transmitting game machine.

**SUBSTITUTE SHEET**

1/4

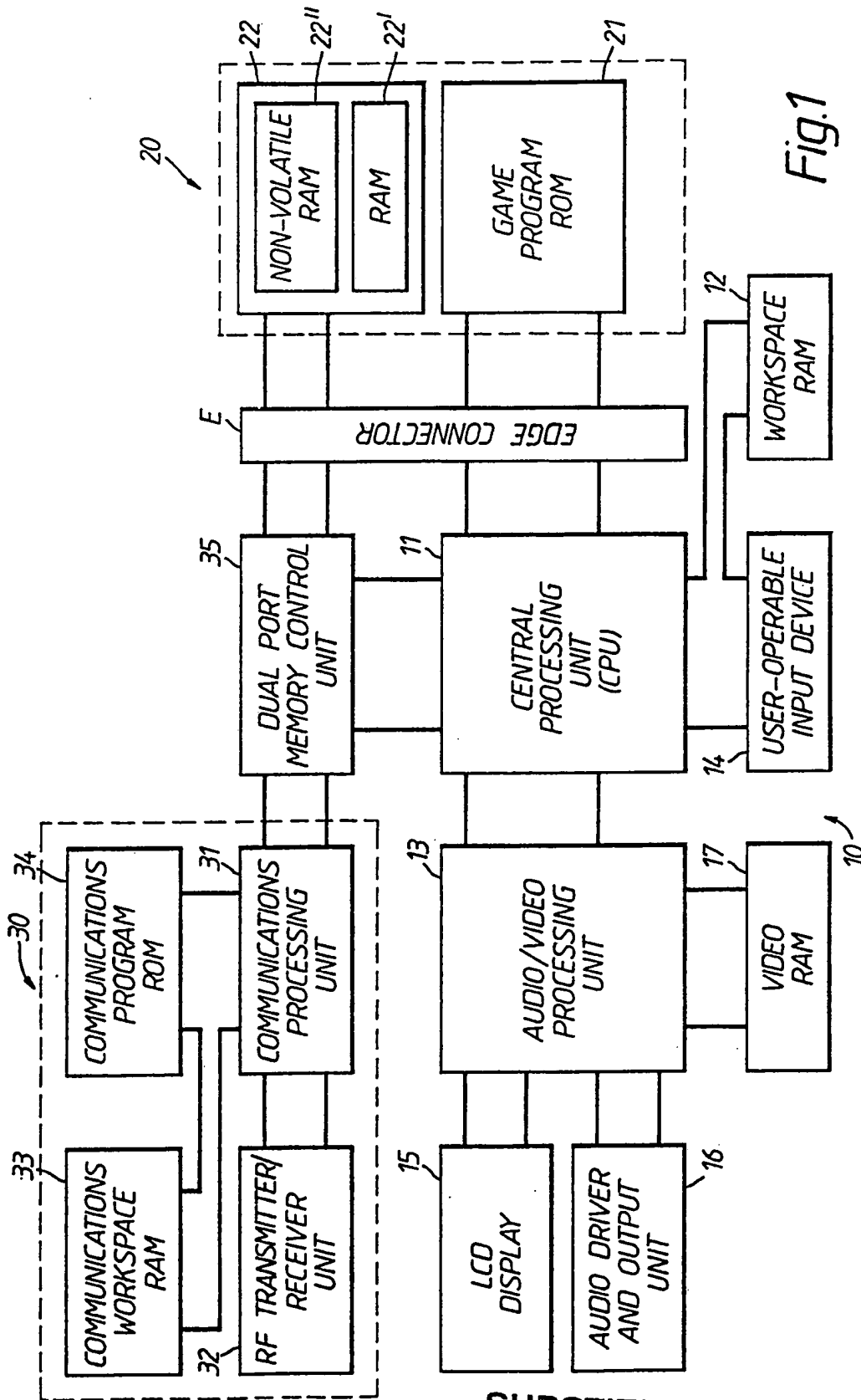


Fig.1

2/4

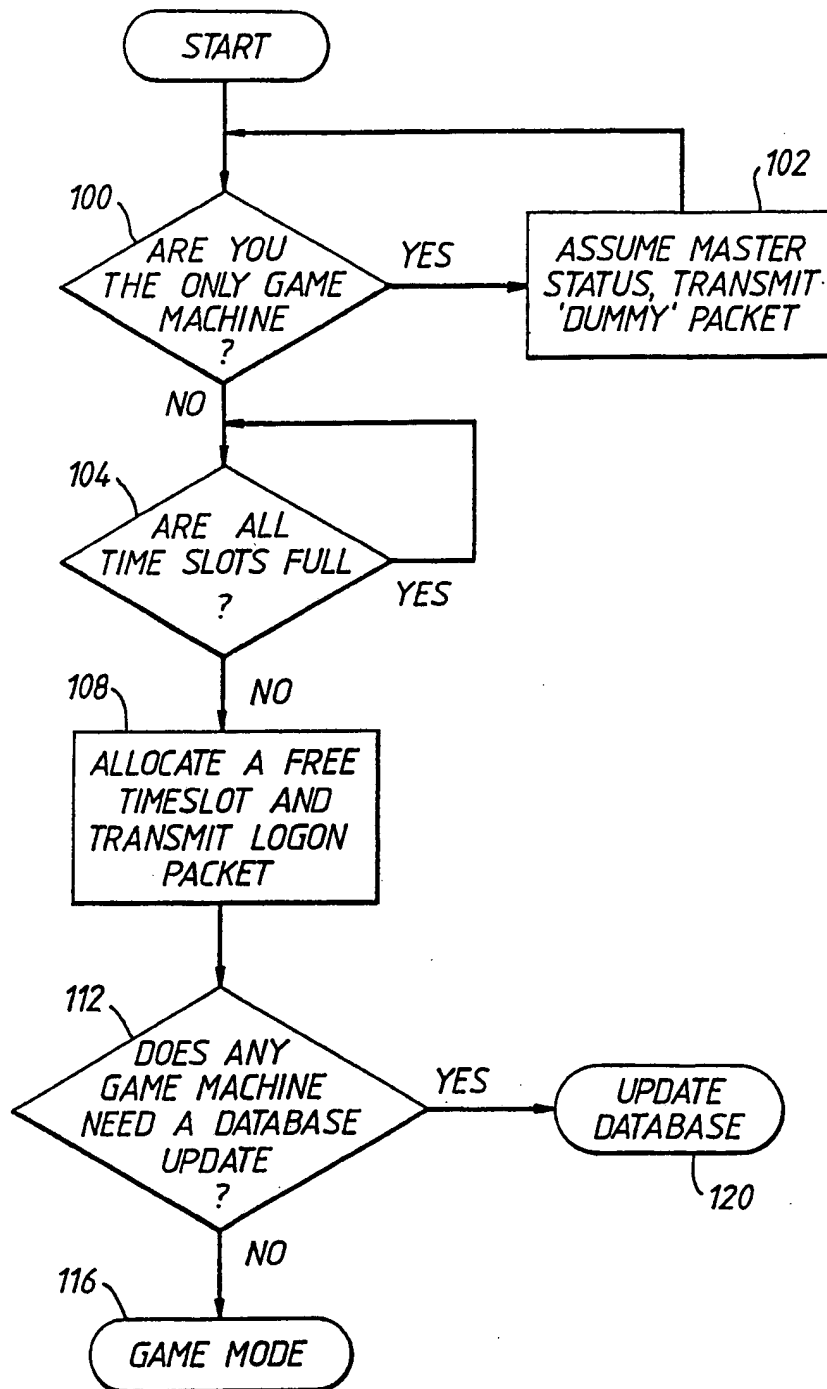


Fig.2

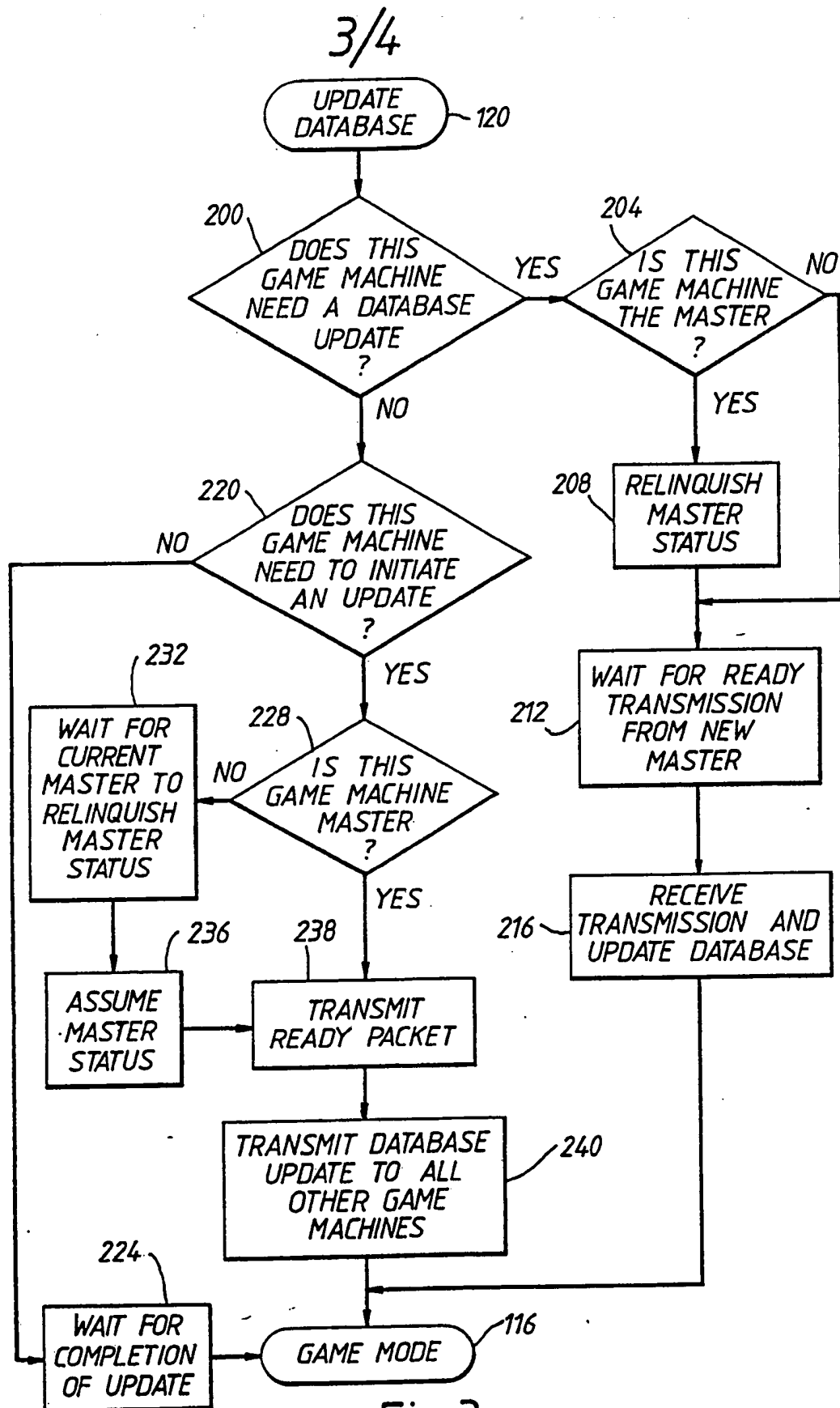


Fig.3. SUBSTITUTE SHEET



4/4

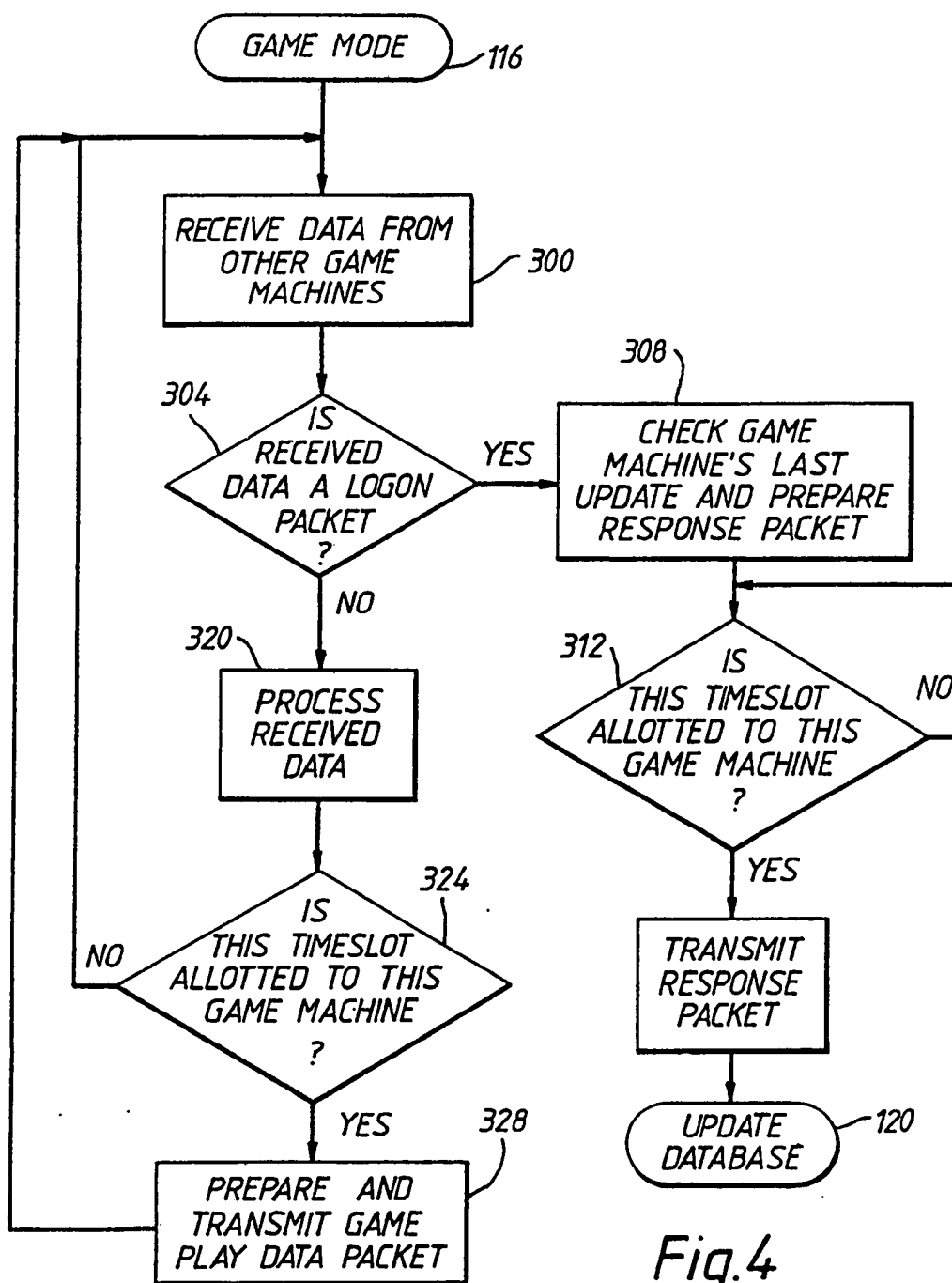


Fig.4



Fig.5 SUBSTITUTE SHEET

## INTERNATIONAL SEARCH REPORT

PCT/GB 93/00997

International Application No

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 A63F9/22		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	A63F ; G06F ; G09B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	US,A,5 048 831 (SIDES) 17 September 1991	1,2, 11-14, 21-24 3-10, 15-20, 25-31
A	see column 1, line 7 - line 15 see column 2, line 5 - line 50 see column 2, line 63 - column 3, line 32 see column 3, line 67 - column 5, line 60 see column 6, line 22 - column 7, line 28 ---	
A	EP,A,0 405 776 (INTERACTIVE NETWORK, INC.) 2 January 1991 see column 3, line 37 - column 4, line 12 see column 4, line 29 - column 5, line 54 see column 7, line 23 - column 8, line 11 --- -/--	1-31
<p><sup>10</sup> Special categories of cited documents: <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
13 JULY 1993		21. 07. 93
International Searching Authority EUROPEAN PATENT OFFICE		Signature of Authorized Officer WENTZEL J.F.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category <sup>a</sup>	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	EP,A,0 485 227 (NINTENDO) 13 May 1992 see column 2, line 5 - column 3, line 24 see column 5, line 29 - column 6, line 49 see column 7, line 42 - column 8, line 30 ---	1, 13, 16, 21, 26
A	US,A,4 998 199 (TASHIRO ET. AL.) 5 March 1991 see column 1, line 64 - column 2, line 30 ---	26
A	US,A,4 520 477 (WEN) 28 May 1985 see column 1, line 35 - line 54 see column 1, line 64 - column 2, line 14 see column 6, line 17 - column 7, line 35 -----	29, 30

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9300997  
SA 74216

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13/07/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-5048831	17-09-91	None	
EP-A-0405776	02-01-91	CA-A- 2018597 JP-A- 3103278 US-A- 5083800	09-12-90 30-04-91 28-01-92
EP-A-0485227	13-05-92	JP-A- 4176235 AU-A- 8704791	23-06-92 14-05-92
US-A-4998199	05-03-91	JP-A- 1091887 JP-C- 1702311 JP-B- 3070993 JP-A- 1091888 JP-C- 1702312 JP-B- 3070994	11-04-89 14-10-92 11-11-91 11-04-89 14-10-92 11-11-91
US-A-4520477	28-05-85	CA-A- 1216350 DE-A- 3375271 EP-A, B 0148175 JP-B- 4041560 JP-T- 60501681 WO-A- 8500262	06-01-87 11-02-88 07-01-88 08-07-92 03-10-85 17-01-85